## REMARKS/ARGUMENTS

This is a Response to the Advisory Action mailed November 8, 2004, in which the three (3) month Shortened Statutory Period for Response is tolling from the Final Office Action, and is due to expire November 16, 2004. Thirty-three (33) claims, including Nine (9) independent claims, were previously paid for in the application. Claim 1 has been canceled. Claims 6, 24 and 25 are currently amended. No new matter has been added to the application. The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090. Claims 2-33 are pending.

In response to a Final Office Action dated August 16, 2004, Applicant requested amendment of claim 24 and restated claim 25 in independent form. In the Advisory Action, the Examiner indicated the amendment of claim 24 would raise a new issue and therefore refused to enter the amendment. The Examiner also suggested an amendment to claim 6 and indicated the amendment would raise a new issue. On November 15, 2004, Applicants' counsel called the Examiner to inquire whether the suggested and requested amendments would overcome the Examiner's rejections of claims 6 and 25. The Examiner indicated he would need time to consider whether the proposed amendments would overcome the cited art. Accordingly, Applicant has concurrently filed a Request for Continued Examination so the Examiner can consider the previously requested and suggested amendments. Applicant respectfully requests a conference with the Examiner if the Examiner believes that the amendments do not place claims 6 and 24, as well as the claims that depend from claim 24, in a position for allowance.

### Objections

The Examiner indicated Claim 25 was allowable if restated in independent form. Claim 25 has been rewritten in independent form to include all limitations of original claim 24. Claim 25 is thus allowable.

### Rejections Under 35 U.S.C. § 102(b)

Claims 24, 26-27 and 29 were rejected under 35 U.S.C. § 102(b) as being anticipated by Summers et al. (U.S. Patent No. 3,808,534).

The disclosed embodiment of the invention will be discussed herein in comparison to the applied reference. Of course, the discussion of the disclosed embodiment, and the discussion of the differences between the disclosed embodiment and the subject matter described in the applied reference, do not define the scope or interpretation of any of the claims. Instead, such discussed differences merely help the Examiner to appreciate important claim distinctions discussed thereafter.

U.S. Patent No. 3,808,534 (hereinafter Summers) is generally directed to a circuit for monitoring voltage across groups of fuel cell stacks. The device taught by Summers provides a warning or shuts down the entire series of fuel cells if a malfunction occurs in any cell within a stack, for example, a short circuit or cell reversal. Summers, Abstract: Col. 1, lines 33-40. In particular, Summers teaches a fuel cell monitor that compares the voltages produced by each of a series of fuel cell stacks *to one another* in order to monitor their outputs. Summers, Abstract, col. 1, lines 41-55; col. 2, lines 10-16; col. 4, lines 29-35; col. 4, line 66-col. 5, line 2; col. 5, lines 43-48 and 60-63. While Summers teaches that the fuel cell stacks may be electrical subdivisions of a large fuel cell stack (Summers, col. 2, lines 43-45), the comparison is always between voltages across adjacent sets of fuel cell stacks.

The Examiner, referring to Figure 2 and col. 5, line 21, describes Summers as teaching that "first and second indications are produced (i.e., lamp 94 is off or on) when voltage across stack 70 is higher or lower, respectively, than a predetermined level (i.e., one-half volt less than the voltage across stack 72)." Office Action at 2, ¶ 2. The level in Summers, however, is not predetermined as suggested by the Examiner, it is ***determined at the same time*** as the comparison is made because the voltage across stack 72 is not known until the comparison is made. Thus, as Applicant previously argued, Summers teaches producing an indication if the *difference* between two voltages across adjacent fuel cell stacks is greater than a threshold voltage. Summers does not compare a voltage across a single fuel cell stack to a threshold voltage. Turning to the specific claim language, Summers does not teach or suggest "producing a first indication when the voltage across the fuel cell structure is greater than a predetermined threshold voltage; and producing a second indication, different from the first indication, when the voltage across the fuel cell structure is not greater than the threshold voltage," as recited by

claim 24. Accordingly, Summers does not anticipate claim 24 or claims 26-27 and 29 that depend from claim 24.

Rejections Under 35 U.S.C. § 103

Claim 28 was rejected under 35 U.S.C. § 103(a) as being obvious over Summers. Applicant respectfully traverse the Examiner's contention that claim 28 is rendered obvious by Summers. Claim 28 depends from claim 24. Thus, for the reasons discussed above, Summers is not an appropriate primary reference for claim 28.

Further, Applicant respectfully disagrees with the Examiner's contention with respect to the obviousness of the proposed modification of the teachings of Summers.

First, the proposed modification is not obvious because it would not achieve the claimed invention. Modifying Summers as suggested by the Examiner would set the threshold for the ***difference*** between voltages (*e.g.*, $V_1$-$V_2$) across adjacent sets of fuel cells (*i.e.*, $Cell_1$ and $Cell_2$ = $V_1$ and $Cell_3$ and $Cell_4$ = $V_2$), rather than the threshold for the ***voltage*** across any individual set of fuel cells.

In addition, while Summers may teach that one skilled in the art can select the number of fuel cells in a fuel cell stack to adjust the voltage output of the fuel cell stack, and that a resistance in a voltage divider may be adjusted to vary the voltage level at which a transistor conducts, there is no motivation in the art for monitoring across a pair of fuel cells using the particular threshold range recited in claim 28.

As discussed in the present application, Applicant has recognized that a fuel cell structure consisting of two fuel cell assemblies optimizes the cell voltage checker circuitry in terms of cost and performance. Employing a fuel cell structure having just a single fuel cell assembly requires twice as many voltage sensing components, while employing a fuel cell structure having more than two fuel cell assemblies lowers the resolution (*i.e.*, ability to detect a minimum voltage drop) of the cell voltage checker. This is particularly true of PEM fuel cell assemblies, where each fuel cell assembly produces a potential difference of approximately 0.6V across the anode and cathode, and a fuel cell structure with two such fuel cell assemblies produces an approximately 1.2V total potential difference.

Monitoring across pairs of fuel cell assemblies takes advantage of the inherent characteristics of most commercially available transistors, which have a trigger or threshold voltage of approximately 0.85V. Where there is an approximately 0.6V potential across each fuel cell assembly, a transistor provides adequate resolution for detecting an operationally significant drop in voltage across a pair of fuel cells having a total nominal potential of 1.2V. The transistor provides an inherent advantage over other electronic components which do not have thresholds that provide as suitable a resolution. For example, commercially available light emitting diodes ("LEDs") or optoisolators have a trigger or threshold of approximately 1.4-1.6 V. As discussed above, there are advantages in cost, structural simplicity, and monitoring effectiveness to monitoring voltage across pairs of fuel cells using transistors, rather than across individual fuel cell assemblies and/or larger groups of fuel cell assemblies.

Summers employs a fuel cell technology other than PEM fuel cells, as demonstrated by the assumption that the fuel cells produce 1V each. Summers, col. 4, lines 53-59. The advantages of using a transistor (*i.e.*, threshold approximately 0.8V-0.85V) for monitoring voltage across pairs of fuel cells (1.2V) is lost in such a situation. Thus, one of ordinary skill in the art would not be motivated to monitor voltage across pairs of fuel cells producing a combined potential of 2V using a transistor, nor to employ the specific threshold range recited in claim 28. This is further made clear by Summers' own teachings, in which their preferred embodiment divides one hundred fuel cells, into four stacks of twenty-five fuel cells each, thus producing approximately 25V across each stack. Summers, col. 2, lines 41-45; col. 6, lines 26-31. Thus, even if PEM fuel cells were substituted, there is no motivation in the art for the recited combination of claim 28. Accordingly, Applicant respectfully submits claim 28 is not rendered obvious by Summers.

Claim 6 was rejected under 35 U.S.C. § 103(a) as being obvious over Summers in view of Vitale et al. (U.S. Patent No. 6,066,408) (hereinafter Vitale). Applicant respectfully traverses the Examiner's contention that claim 6 is rendered obvious by the combination of Summers and Vitale.

The Examiner relies on Summers as suggesting the monitoring of fuel cell stacks and on Vitale as disclosing PEM fuel cells, which are solid polymer fuel cells. The Examiner

correctly notes that claim 6 is open-ended with regard to the number of cells in a stack, and thus is not limited to stacks with only two PEM cells. Claim 6, however, recites "the transistor coupled to respond to a voltage across only the pair of solid polymer fuel cells." Summers does not teach or suggest responding to a voltage across only a ***pair*** of fuel cells, as recited. Summers monitors voltages across ***stacks*** of adjacent fuel cells, and, as discussed above with regard to claim 28, does not teach or suggest the monitored stacks comprise pairs of solid polymer fuel cells. While Vitale notes several advantages of PEM fuel cells, it does not note any advantages to monitoring such cells in pairs and does not otherwise teach or suggest doing so. In fact, Vitale suggests fuel cell stacks comprised of four PEM cells. Col. 6, lines 60-64. Thus, the only suggestion to monitor pairs of fuel cells comes from the Applicant's own teachings. Accordingly, Applicant respectfully submits that claim 6 is not rendered obvious by the combination of Summers and Vitale.

Conclusion

Applicant thanks the Examiner for allowing claims 2-5, 7-23 and 30-33, and for indicating the allowable subject matter of claim 25. Overall, the cited references do not singly, or in any motivated combination, teach or suggest the claimed features of the embodiments recited in independent claims 2, 6, 7, 12, 16, 24, 25, 30 and 32, and thus such claims are allowable. Because the remaining claims depend from the allowable independent claims, and also because they include additional limitations, such claims are likewise allowable. If the undersigned attorney has overlooked a relevant teaching in any of the references, the Examiner is requested to point out specifically where such teaching may be found.

In light of the above amendments and remarks, Applicant respectfully submits that all pending claims are allowable. Applicant, therefore, respectfully requests that the Examiner reconsider this application and timely allow all pending claims. Examiner Crepeau is encouraged to contact Mr. Boller by telephone to discuss the above and any other distinctions

between the claims and the applied references, if desired. If the Examiner notes any informalities in the claims, he is encouraged to contact Mr. Boller by telephone to expediently correct such informalities.

Respectfully submitted,
Seed Intellectual Property Law Group PLLC

Timothy L. Boller
Registration No. 47,435

TLB:rg

Enclosure:
Postcard

701 Fifth Avenue, Suite 6300
Seattle, Washington 98104-7092
(206) 622-4900
Fax: (206) 682-6031

532895_1.DOC